
UNITED STATES DEPARTMENT OF AGRICULTURE

INFORMATION AND COMMUNICATION

Goal: Collect and analyze internal and external information to monitor and enhance program effectiveness. Communicate internally and externally to accomplish our mission and to build an understanding of the Federal role in wildlife damage management.

INFORMATION SERVICES

NWRC's Information Services Unit—In FY 1999, the NWRC information services unit once again packed the Center's entire library collection into boxes and moved to its new quarters in the Wildlife Science Building. The additional space gained in this new building has allowed the Center to expand its services to the WS program, stakeholders, and the public. The library's new location, immediately off the main entrance to the building, has increased its visibility, and its new furnishings (including new periodical display shelving), public access computer terminal, and open room design make it very inviting and usable.

Library personnel continued to update the NWRC Website. The full text of each 1998 NWRC publications in PDF format was added to the site. New photos and project descriptions were included, and design changes were instituted. Each research program page is now directly linked from the homepage of the site. The Gainesville, FL, field station page was redesigned, and its staff provided new research project details. Changes to the remaining field station pages are in progress. New research descriptions include predator depredations, the tranquilizer trap device, a passive index for monitoring coyote movements, and zinc phosphide use by WS. All 400 individual species chapters in the Birds of North America series have been added to the NWRC online catalog. An employment Webpage has been added, and all NWRC job announcements are now posted on the Web. A Webpage was established for the planned August 2000 NWRC-sponsored "Human Conflicts with Wildlife: Economic Considerations" symposium, and a new timeline history of NWRC has replaced the former descriptive history page. Optical character recognition software is being tested for scanning older NWRC publication lists for placement on the Web and a search engine will be added for keyword searching of publication lists.

The NWRC library staff frequently responds to information and reference questions coming to the Center via the Web. Questions relating directly to work done at NWRC are immediately answered by library personnel; other questions may be referred to appropriate outside agencies and individuals. Inquiries have covered such diverse topics as wildlife rehabilitation, wildlife diseases, dolphin killing by fishermen, construction of outdoor water structures, identification of poisonous snakes, employment in the wildlife biology field, wildlife importation rules, and bird banding.

The NWRC library worked with the WS Operational Support Staff to provide Internet access for the Wildlife Worldwide data base. This product was tested by WS personnel and was considered extremely useful. In 1999, passwords were purchased to provide access to the data base for WS staff in all States. The library also purchased Graphical Library Automation System (EOS, Inc.) software to permit upgrading the Center's catalog, serials, and circulation modules from DOS to Windows. Desktop access to library CD–ROM's was provided to all Fort Collins staff. Subscriptions to Current Contents on Diskette and in paper copy were replaced by desktop Internet access. Four new journal subscriptions were added, and the library is studying the usefulness of electronic access to selected periodicals.

Library personnel have provided extensive background documentation in support of WS Environmental Assessments and Center research projects. More than 200 literature searches were performed. Search topics included chemical repellants, chemical identification and source location, control of exotic or invading species, control methods for various pest species, and citation verifications. The Internet was used to an ever greater degree in the information-gathering process and its resources now regularly supplement more standard online information sources. More than 1,600 photocopies were made from journals and books in the NWRC library for distribution to requestors. In addition, NWRC was better able to use the CSU library resources because their collection has been restocked since being damaged in the 1997 Fort Collins flood. This year NWRC library staff made more than 815 photocopies of materials at CSU. More than 2,250 NWRC-authored reprints were distributed as well as more than 500 copies each of the Center's annual publications list, highlights report, and newsletter. Other libraries requested 339 photocopies and books from the NWRC, and the NWRC Library, in return, requested at least 853 items from other libraries.

Worldwide Rodent Bibliography—A cooperative endeavor between NWRC and the Danish Pest Infestation Laboratory has been initiated to compile a worldwide rodent bibliography. This bibliography will combine more than 14,000 references maintained by the Danish lab and 9,000 maintained by NWRC on rodent ecology, biology, behavior, zoonoses, taxonomy, control, and epidemiology. A searchable data base will be assembled at NWRC and made available on a CD–Rom. Possibilities for access and use of this data base via the NWRC Webpage are being explored.

Living With Wildlife Activity Sheets— The WS Public Outreach Committee produced nine activity sheets for fifth- and sixth-grade children in 1999. Subjects include beaver, coyote, cougar, BTS, Canada goose, raccoon, deer, blackbird, wildlife research, and a national reader. Each activity sheet has information on the biology and food habits of the animal, legends and folklore, economic and damage issues, and a crossword puzzle. The sheets are available in PDF format on the NWRC Website at http://www.aphis.usda.gov/ws/nwrc.

Information Displays—NWRC staff worked with APHIS' Legislative and Public Affairs and USDA Design Division staff to create and install hallway displays in the main lobby area of the new Wildlife Science Building. The displays welcome visitors to the Center and describe its history, research accomplishments, and successful tools created by NWRC researchers. Additionally, more than 60 scientific and information posters illustrating current research projects have been installed in the hallways. The posters have served as an excellent source of information on NWRC research for individual visitors and tour groups.

Conference Services—NWRC's Wildlife Science Building includes a conference center with state-of-the-art audio visual technology. Numerous groups from local State and Federal agencies have made use of the facility for training, meetings, and seminars this past year.

SEMINARS

During FY 1999, NWRC continued to be a focal point for interesting seminars by its own and visiting scientists.

NWRC SEMINARS

Speaker	Affiliation	Topic
James Pfister	USDA–Agricultural Research Service Poisonous Plant Research Laboratory, Logan, UT	Impacts of plant toxins on foraging behavior and nutrition of herbivores
Roger Sayre	APHIS Science Fellow, NWRC	Bighorn sheep behavior: response to human disturbance
David Morris	Texas A. & M. University	Synchronizing ovulation in beef cattle
Paul Nash	University of Colorado Health Sciences Center, Dept. of Immunology	Immune response to *T. gondii* after primary and secondary infection and inhibition of apoptosis by *T. gondii* infection
David Jasko	Cornell University	Reproduction in managed horses and strategies for control in feral horses
Scott Hygnstrom	University of Nebraska–Lincoln	Science is “Deer” to me—Study results and sabbatical aspirations
Ann Kitchen	Utah State University	Resource partitioning between swift foxes and coyotes
Matthew Coles and Heather Kullas	Colorado State University	Surveillance for pathogenic bacteria from urban Canada goose populations
Gary White	Colorado State University	Designing control-treatment experiments with marked animals using program MARK
Lynn Creekmore	National Wildlife Health Center, Madison, WI	Cause of mortality in southern sea otters
Terry Hensley	APHIS, VS	Foreign animal diseases
Charlotte Quist	University of Georgia	The trap study, lesions produced by leghold traps
Roger Few	NWRC, APHIS Science Fellow	Enhancing the efficacy of primary repellants

MEETINGS, WORKSHOPS, AND CONFERENCE PRESENTATIONS

Bird Strike Committee–USA—Bird Strike Committee–USA (BSC–USA) was founded in 1991 to increase communication and professionalism among the diverse groups dealing with the economic and safety issues related to aircraft collisions with birds. Until BSC–USA was founded, there was no forum in the United States for training, scientific papers, vendor displays, and general discussions regarding the management of wildlife hazards to aviation. BSC–USA has an eight-person steering committee consisting of two members each from USDA, FAA, DoD, and the aviation industry. Scientists from NWRC have played key roles in many aspects of the organization from the beginning, including organizing the scientific program at each of the seven annual conferences, 1992–98. Attendance at these annual conferences has grown from 12 people in 1991 to 312 in 1998. In addition to the scientific programs, highlights of annual conferences in recent years have included keynote speeches by national political and aviation leaders, demonstrations during field trips of various techniques for managing wildlife at airports, and vendor exhibits of wildlife management products. In 1999, BSC–USA combined with Bird Strike Committee Canada and aviation officials from Mexico to hold the first Bird Strike Committee North America meeting in May at Vancouver International Airport in British Columbia. BSC–USA has played a key role in elevating awareness within the aviation industry to research and management expertise within USDA's Wildlife Services program.

CSU Carnivore Issues Course—A senior wildlife seminar during the fall 1998 semester, a capstone course for CSU students about to graduate from the Department of Fishery and Wildlife Biology, was taught by an NWRC research biologist. Using an informal format, the biologist and students discussed the history and current status of carnivores, carnivore ecology and management, human–carnivore conflict resolution, research needs, and carnivore reintroductions. Discussions were based on selected readings and the combined experiences of the biologist and the students. Each student was required to make an individual presentation, lead a topical discussion, or submit a term paper. The course was further enhanced by guest speakers and wildlife videos.

International Conference on Rodent Biology and Management—Two NWRC scientists participated in the International Conference on Rodent Biology and Management held in Beijing, China, October 5–9, 1998. More than 140 representatives from 26 countries attended the conference. Papers and workshops covered developments in the fields of rodent behavior, chemical communication, population dynamics, physiology and adaptation of rodents, rodents as indicators of environmental change and their role in maintenance of the ecosystem, epidemiology of rodent diseases and their impact on rodent populations and humans, and rodent management and control techniques. NWRC scientists presented a plenary talk on the current status of rodent management in the United States and two other presentations on current trends in rodent damage management for Hawaiian agriculture and conservation and impact of rodents on reforestation in the United States. One NWRC scientist also chaired a workshop and discussion session on rodent damage management. The discussion focused on improving communication among biologists working to reduce rodent associated problems, assessing the intensity or extent of damage, and monitoring rodent populations.

Ohio State University Student Field Day—The NWRC's Sandusky field station and the Ohio WS program hosted 22 graduate and undergraduate wildlife biology students from The Ohio State University at the 6,000-acre Plum Brook Station in early October. Students were given hands-on instruction in the scientific method by collecting data to estimate the size and dynamics of a deer population. Emphasis was placed on emerging conflicts between wildlife and people and the integrated research and management programs needed to resolve these conflicts. This is the 14th year that the Ohio field station has hosted these field exercises to educate natural resource students about the importance of wildlife damage control as a key component of the wildlife profession.

BTS Seminar—A WS operations staff member from Guam and an NWRC researcher from Fort Collins cooperated in presenting a seminar on BTS control and research work activities on Guam to the environmental biology class at the University of Guam on November 5, 1998. Operational snake control activities discussed included trapping, detector dog teams for searching outbound cargo, spotlight searching of fences, temporary barriers, and public relations programs to inform people about the environmental, economic, and safety and health concerns associated with snakes. Research and development of chemical fumigants and oral and dermal toxicants as well as their potential

use in an integrated program with other control techniques to reduce populations of snakes were discussed. The seminar concluded with demonstrations of snake handling and dosing techniques, presentation of videocassettes showing behavior of snakes at lure stations in the field, and a question-and-answer session about snake control and research activities.

Consortium for International Crop Protection Annual Meeting—An NWRC scientist from Fort Collins attended the Annual Board Meeting of the Consortium for International Crop Protection (CICP) in Las Vegas, NV, in November 1998. The CICP board has representatives from 11 U.S. universities and the USDA. The mission of CICP is similar to that of APHIS but focuses on developing countries: increasing supplies of nutritious and safe foods by reducing the losses caused by pests in ways that are appropriate for local economies and sociological and environmental situations and that encourage integrated pest management (IPM) and appropriate new technologies. CICP provides IPM information over the Internet www.ipmnet.org and supports workshops and conferences that disseminate information and develop communication linkages. A data base of IPM resources is maintained at OSU. The board assessed the successful workshop in Africa and planned similar efforts for Latin America and Eastern Europe. The success of IPMnet News, an e-mailed newsletter, was discussed along with ways to bring in larger CICP membership and donor funding.

Vertebrate Pests of Agriculture, Forestry, and Public Lands Western Coordinating Committee (WCC)—Also during November, several NWRC biologists attended the annual meeting of WCC–95 in Reno, NV. This group, which is sanctioned through the USDA agricultural extension program, consists of about 40 participants from academia, industry (chemical registrants), and Federal and State governments who make up the Western Coordinating Committee of Vertebrate Pests of Agriculture, Forestry, and Public Lands. The group attempts to foster communication, research, and extension activities affecting vertebrate pest issues in 13 Western States. Some key discussions at this year's meeting focused around stakeholder responses to recent RED's released by EPA for registered end-product pesticides; effects of California's Proposition 4 (ban on leghold traps, sodium cyanide, and sodium monofluoroacetate [Compound 1080] for management of mammalian predators); approval of a new 5-year petition to continue the group's activities, research, chemical registration, and public policy; and consideration of forming a similar committee to address wildlife and resource-management issues affecting Northeastern States.

Predator Management Board—An NWRC scientist from the Logan, UT, field station presented a talk on NWRC predation management activities to the Predator Management Board in Durango, CO, in December 1998. Ongoing research and the need to maintain and improve existing tools were discussed. The board meeting was attended by ranchers, Government officials, and representatives from various interest groups, including the Audubon Society. The talk was well received, and the Audubon Society requested NWRC scientists to present additional information to a larger forum in 2000.

Utah Woolgrowers and Cattlemen's Association—An NWRC scientist from the Logan, UT, field station presented a talk on coyote ecology at the annual meeting of the Utah Woolgrowers and Cattlemen's Association in December 1998. Biology and predatory behavior of coyotes were discussed in the context of how ranchers can work with WS specialists to take coyotes responsible for depredation selectively.

U.S. Department of Defense Meeting—In February 1999, the NWRC hosted the Annual Review of USDA Research of Interest to the U.S. Department of Defense. USDA research was presented by scientists representing the Forest Service, Agricultural Research Service, and NWRC. Center participants focused on wildlife issues related to chemical repellants, reproductive inhibitors, integrated pest management, bird–aircraft interactions, chemical registration, and BTS control. About 80 individuals from USDA, DoD, CDC, and the U.S. Geological Survey attended this first-ever symposium at the NWRC Wildlife Science Building in Fort Collins.

Pacific Seabird Group 26th Annual Meeting—A biologist from NWRC's Starkville, MS, field station attended the 26th Annual Meeting of the Pacific Seabird Group in February at Blaine, WA. The biologist presented a paper on movements of American white pelicans banded at Marsh Lake, MN, with emphasis on their relationship to aquaculture in the Southeast. Before 1985 and the expansion of Southeastern aquaculture, only 5 percent of pelican band recoveries were from areas of high aquaculture production. Since 1985, more than 21 percent of the band recoveries have been from aquaculture areas, suggesting that commercially raised fish are an important food source for wintering and migrating American white pelicans. The biologist also participated in a research and information needs workshop for the North American Colonial Waterbird Conservation Plan. This plan will provide a blueprint of the research, monitoring, management, and public outreach needs of colonial waterbirds throughout North America.

NWRC Hosts Veterinary Services' Emerging Diseases Workshop—A special planning session of APHIS' Veterinary Services (VS) was held in Fort Collins in March to discuss emerging wildlife–livestock disease issues. The meeting was facilitated by APHIS' Policy and Program Development personnel. The session was also attended by personnel of VS' Centers for Epidemiology and Animal Health, the Southeastern Cooperative Wildlife Disease Unit, and an NWRC research biologist. Wildlife has been linked to recent outbreaks and the spread of chronic wasting disease, bovine tuberculosis, brucellosis, rabies, and other diseases. VS personnel are prepared to deal with these diseases in livestock but not necessarily in wildlife. The group agreed that VS needs to focus its efforts on (1) disease investigation, (2) disease monitoring and surveillance, (3) applied research, (4) training and information transfer, and (5) appropriate regulations. Action items identified were to (1) increase funds to process the many wildlife samples submitted each year, (2) enhance communication and information networks between VS and other appropriate entities, and (3) train VS personnel in various aspects of wildlife identification, monitoring, handling, and processing. Increased wild game farming and the extensive market in exotic wildlife make the success of these efforts even more urgent.

Managing for Biodiversity Conference—Between March 30 and April 2, personnel from the NWRC's Gainesville, FL, field station attended the joint spring conference of the Florida Wildlife Society and Natural Areas Association entitled "Managing for Biodiversity" held in Orlando. More than 150 people were in attendance, including wildlife biologists and ecologists from the private sector, and State and Federal wildlife management agencies. Topics covered included wildlife conservation and management, ecological restoration, prescribed burning, and ecotourism. NWRC staff presented results from studies that evaluated relocation as a management tool for vultures and wading bird depredation at tropical aquaculture facilities. Florida NWRC staff maintain a longstanding tradition of membership and involvement in the Florida Wildlife Society. This association has been of value in maintaining lines of communication with Federal and State wildlife managers and regulators and in fostering alliances that facilitate wildlife research and management in the State.

Catfish Research and Industry Update Forum—A biologist from NWRC's Starkville, MS, field station participated in a catfish research and industry update forum in March, sponsored by the Alabama Catfish Producers and the Alabama Fish Farming Center. The biologist highlighted the mission of the Starkville field station and its cooperative work with the Alabama WS program on a cormorant roost-dispersal effort. More than 150 people attended the forum.

Swift Fox Seminar—On March 15, a Utah State University graduate student working with NWRC biologists at the Logan, UT, field station, presented a seminar on resource partitioning between swift foxes and coyotes at NWRC in Fort Collins. This student investigated the spatial, temporal, and dietary overlap between swift foxes and coyotes and found a high degree of interspecies overlap in all factors. However, even with a spatial overlap, foxes did not temporally avoid coyotes. Some dietary partitioning occurred between the two species, for coyotes tended to consume larger mammalian prey species whereas swift foxes tended to consume smaller prey species. The main strategies used by swift foxes that allow for coexistence with coyotes were year 'round use of dens and some degree of dietary partitioning.

Utah State University Career Fair—A biologist from NWRC's Logan field station participated in Utah State University's Annual Career Fair in March. She supplied materials about APHIS to interested students and answered their questions about careers available in APHIS for graduates with various majors. Over the last 4 years, both Plant Protection and Quarantine and WS personnel have worked together at the booth. This association has proved useful in broadening the relationship between these APHIS programs as potential employers of Utah State University students.

Lake Erie Wing Watch Weekend—Scientists from NWRC's Sandusky field station staffed a display booth promoting NWRC research findings and the WS program on April 10 at the Lake Erie Wing Watch Weekend. This is an annual event sponsored by the Visitors Bureaus and Audubon Society chapters from three northern Ohio counties that is designed to educate the public regarding the importance of bird watching and wildlife refuges to the tourism economy of northern Ohio. The western basin of Lake Erie is a critical migratory corridor for waterfowl, shorebirds, and neotropical migrants in North America. The theme of the NWRC display, resolving conflicts between people and wildlife, emphasized wildlife damage management as an integral part of conservation programs designed to protect and enhance bird populations. Ohio has large populations of blackbirds, starlings, gulls, Canada geese, cormorants and herons—species that often conflict with human activities. More than 500 people attended the program, and the NWRC display generated much positive interest and many questions. NWRC has participated in this program annually since its inception in 1993.

Northeastern Association of Wildlife Damage Biologists—An NWRC scientist with the Logan field station attended the eighth annual meeting of the Northeastern Association of Wildlife Damage Biologists in Manchester, NH, in April. The Association now has a Website that presents its newsletter and provides links to other damage management Websites in the Northeast. The 1999 meeting covered the status of deer damage-management laws in the Northeast and the establishment and funding of a northeastern wildlife damage management cooperative to serve the needs of the 13 Northeastern States.

Red Wolf Program Review—Biologists from NWRC's Logan field station attended the Red Wolf Program review in Virginia Beach, VA, in April. More than 40 researchers, managers, and administrators were assembled to participate in this workshop whose purpose was to develop a plan for the continued recovery of the red wolf. Issues and programs addressed included captive breeding, site selection, canid management, hybridization, modeling, and monitoring of red wolves in the free-ranging population. It was the consensus of all participants that hybridization of red wolves and coyotes is an immediate concern and that management actions are necessary to reduce its occurrence.

International Seminar on Flight Safety and Birds in the Middle East—A biologist from NWRC's Sandusky field station was an invited participant in the International Seminar on Flight Safety and Birds in the Middle East in Tel Aviv, Israel, in April. He presented a seminar on aerodrome bird hazard prevention and discussed a case study at John F. Kennedy International Airport that compared the results of shooting and falconry in reducing bird strikes. The study indicated that shooting gulls reduced strikes by 80 percent from 1991 through 1998. The addition of falconry to the bird control program in 1996 through 1998 generated considerable positive publicity but has not further reduced strikes. The presentation was featured in an article in Ha 'aretz, the major daily newspaper in Israel. The seminar, organized by Tel Aviv University, was designed to increase cooperation among countries in the Middle East in reducing bird strikes and to further the peace process in the region. Participants included air force officers from Israel, Jordon, Turkey, Greece, and the United States. Mr. Shimon Peres, former Israeli prime minister, was a featured guest at the meeting.

Association for Chemosensory Sciences Meeting—NWRC biologists from Fort Collins attended the annual meeting of the Association for Chemosensory Sciences in Sarasota, FL, in April. The Association is devoted to the study of how animals and humans detect, process, and act upon chemosensory information. One biologist served on this year's scientific program committee. Three posters were presented by NWRC scientists on the topics of preferences of European starlings for mixtures of natural plant products; development of cell culture methodology to screen trigeminally mediated chemical repellants; and the effects of capsaicin, denatonium, and Vexar™ plastic mesh plant protectors as chemical and physical repellants on gnawing behavior of wild Norway rats.

Worldwide Airport Technology Conference and Exposition—Two biologists from NWRC's Sandusky field station presented results from research on wildlife hazards to aviation at the 1999 Worldwide Airport Technology Conference and Exposition in Atlantic City, NJ, in April. The conference was attended by representatives from throughout the aviation industry. The keynote address by James Hall, chair of the National Transportation Safety Board, highlighted bird strikes as a key safety issue facing the aviation industry. Topics covered by the NWRC scientists included the development and registration of an anthraquinone formulation to repel geese from airports and the use of Forward Looking Infrared equipment to monitor deer populations and wildlife activity at airports.

Bird Strike Committee–USA and Canada Joint Meeting—About 300 people from 14 countries attended the first combined annual meeting of Bird Strike Committee–USA (BSC–USA) and Bird Strike Committee Canada (BSCC) at Vancouver International Airport, British Columbia, between May 9 and 13, 1999. In all, 47 technical papers and posters were presented on topics related to reducing wildlife collisions with aircraft. NWRC scientists presented papers and posters on grass management at airports and on the National Bird Strike Database. Highlights of the conference included keynote addresses by Major General Francis Gideon, Jr., head of the U.S. Air Force Safety Agency; John Kern, vice president for safety at Northwest Airlines; Art LaFlamme, director general of aviation at Transport Canada; and USDA Under Secretary Mike Dunn. In addition, 14 companies exhibited or demonstrated their wildlife management products during a tour of the Vancouver airport. The goal of BSC–USA and BSCC is to increase communication and professionalism among the diverse groups dealing with wildlife issues at airports. The next joint meeting of BSC–USA and BSCC will be August 8–10, 2000, at Minneapolis–St. Paul International Airport.

Wildlife Strikes to Civil Aircraft—Biologists from NWRC's Sandusky field station, in cooperation with the FAA, have completed a summary of all wildlife strikes to civil aircraft in the United States between 1991 and 1997. During this 7-year period, there were 16,949 reported strikes, of which about 97 percent involved birds and 3 percent mammals (mostly deer). The average cost per year to civil aviation from these strikes was estimated to be $315 million. The report contains detailed information on such strike

characteristics as species of wildlife, time of day, geographic area, altitude, time of year, and phase of flight. Information documenting the hazards of wildlife at airports is critical for developing and presenting wildlife plans for airports. This report can be found on the Internet and downloaded with the use of Adobe Acrobat Reader at www.faa.gov/arp/arphome. Once the user has found this page, select Browse by Topic and find Bird Strike Report.

Predator Experiences—In May, an NWRC biologist with the Logan–Millville field station presented a class on predators and herbivores to the Family Development Preschool. The class included 20 children ages 3–4 and 5 preschool teachers. Among the topics presented were the basic anatomical differences between predators and herbivores and a hands-on demonstration using animal skulls and skins and young goats to demonstrate precocial attributes of prey animals. In June, 19 people from an assisted living facility in Logan also visited this NWRC research facility. Station personnel described the history of the facility and explained its research program. A bus tour provided additional opportunities for the people to view adult coyotes, have a closeup experience with hand-reared coyote pups, and to discuss various aspects of the Center's predator research and its application to solving depredation problems.

Wildlife Services National Meeting—WS held a national meeting in May in Estes Park, CO. More than 170 participants from the eastern and western regions, headquarters, and NWRC attended. The theme for the conference was charting a course for the millennium through partnerships, politics, and science. Keynote speaker Dwight Guynn, FWS, spoke on wildlife professionals facing the future and the need for the profession to change and adapt to meet the new needs of the 21st century. Participants attended a variety of workshops on topics such as invasive species, deer damage and management techniques, Canada goose and blackbird problems, traps and lures, and public outreach. They also attended field trips on elk management in Rocky Mountain National Park, toured the NWRC and visited prairie dog colonies near Fort Collins.

Ecological Committee on FIFRA Risk Assessment Methods—An NWRC registration unit employee participated in a 1-year series of bimonthly meetings sponsored by the EPA to evaluate EPA's pesticide environmental risk assessment guidelines. The 48-member Ecological Committee on FIFRA Risk Assessment Methods was composed of representatives from EPA, USDA, Environment Canada, the American Crop Protection Association, pesticide manufacturers, nongovernment environmental organizations, academia, and environmental consultants. Workshop participants were asked to develop methods for determining the probability of an organism's exposure to pesticides and the subsequent effects of those pesticides. A draft report was issued by EPA in May 1999, and a final report should be available by spring 2000. Implementation of any proposed changes to existing methods would occur gradually as data bases are developed and the new methods are validated. Methodology was provided for conducting exposure and effects modeling and for combining the output from the exposure and effects model into a tiered risk characterization process. To standardize lower tier risk assessments, recommendations were made for selecting key species for use in standardized exposure and effects models. Additionally, recommendations were made for redesigning standard toxicity tests to make outputs more appropriate for use in probabilistic models.

Agriculture in the Classroom Summer Institute—NWRC hosted a visit from more than 20 elementary and middle school teachers in June as part of the USDA–Colorado Agriculture in the Classroom Program. Scientists gave an overview of NWRC's mission and research, and participants were given a tour of Center facilities.

Temperate Rice Conference—A biologist from NWRC's Gainesville, FL, field station attended the Second Temperate Rice Conference in June in Sacramento, CA. The biologist presented a talk on recent developments in the control of blackbird depredations in ripening rice. In addition to technical paper sessions, the conference included a special symposium on rice and the environment and a daylong field trip and tour of rice fields and research projects in the Sacramento Valley with particular emphasis on enhancement of rice field habitat for waterbirds. The conference was attended by more than 250 delegates from 12 temperate rice-producing countries. The third conference is scheduled to be held in 2003 in Uruguay.

Avian Mortality at Communication Towers—In July, a biologist from NWRC's Gainesville field station was an invited participant in a meeting convened by FWS in Washington, DC, that addressed the problem of avian mortality at communication towers. It is estimated that millions of neotropical migrant birds are killed annually through collisions at tall, lighted TV, radio, and communication towers. This phenomenon has been documented since the 1950's but has been subject to very little experimental research. Concern over tower kills has increased lately for two reasons: the continued declines in populations of many neotropical migrants, which are the birds most often killed at towers, and the proliferation of towers in recent years because of the wireless communication industry. The meeting also included representatives from the FAA, Federal Communications Commission, wireless communication companies, and environmental organizations, as well as research scientists. Discussions centered on defining what is known about the problem, identifying

information and research needs, and forging alliances of interested parties to address the identified research needs. A coordinating committee was formed to facilitate additional discussions among stakeholders to refine goals and establish research priorities.

Another workshop entitled "Avian Mortality at Communication Towers" was held in August as part of the 117th meeting of the American Ornithologists' Union at Ithaca, NY. This workshop, cosponsored by FWS, the American Bird Conservancy, and the Ornithological Council, was the first of its kind on the problem of avian mortality caused by collisions with cellular, radio, and TV towers. It was generally decided that research is needed to define the nature and extent of the mortality problem more completely and identify priority research areas that will lead to developing methods to reduce avian collision mortality.

Southeastern WS Meeting—Personnel from NWRC's Gainesville field station participated in a meeting of Florida, Alabama, and Georgia WS State directors and staff in August in Key Largo, FL. NWRC personnel presented summaries of recent and planned research in tropical aquaculture, tropical fruit damage, and vulture management. Training in first aid and cardiopulmonary resuscitation, defensive driving, firearm safety, and the use of AC was also provided. This was the first multi-State meeting hosted by the Florida State WS program, and it provided a good opportunity for WS personnel in the three-State area to exchange information and ideas.

Double-Crested Cormorant Management Meeting—Populations of double crested cormorants have increased dramatically over much of North America during the last 2 decades and today are a source of conflict on both their wintering and breeding grounds. Cormorants cause millions of dollars' worth of losses for commercial aquaculturists in the Southern United States, are a perceived threat to sport and commercial fishermen in the northern United States and Canada, and compete with other waterbirds for breeding sites. In 1998, FWS issued a new regulation approving the oiling of eggs of cormorants breeding on Little Galloo Island in Lake Ontario. An NWRC biologist attended a meeting in August in Sackets Harbor, NY, to discuss research and monitoring needs for managing double-crested cormorants in eastern Lake Ontario. The meeting was attended by 37 people from private, Government, and university organizations in Canada and the United States. A consensus was reached that more information is needed about regional movements to manage the impact of cormorants in eastern Lake Ontario; that a better understanding is needed of migratory movements, life history, and demography of cormorants; and that a credible population model is needed to manage cormorants on a flyway basis.

Northwest WS State Meeting—A biologist from the Sandusky field station represented NWRC at the WS State meeting for Washington, Alaska, Hawaii, and Guam at Ft. Worden State Park, WA, in July. He made a presentation on managing wildlife hazards on airports. This talk emphasized research being conducted by NWRC scientists (e.g., development of the National Wildlife Strike Database and the bird-feeding repellant Flight Control) that provides a scientific foundation for WS management programs at airports. Wildlife hazard management at airports is an increasingly important undertaking for the WS program. WS biologists provided assistance at 363 airports in the United States in 1999. The conference was attended by about 60 WS employees as well as by several Washington State biologists.

CSU Undergraduate Research and Creativity Symposium—Two CSU undergraduates, Heather Kullas and Matthew Coles, who are working under the direction of an NWRC biologist in Fort Collins, earned the Highest Distinction Award for their presentation on the survey, identification, and isolation of Escherichia coli and Salmonella spp. in Canada goose fecal matter at CSU's fifth annual Undergraduate Research and Creativity Symposium. The students' work is part of an independent research project through the Department of Fisheries and Wildlife Biology at CSU. Kullas and Coles are quantifying the relationship between specific zoonotic diseases and goose fecal load in urban landscapes within Fort Collins.

European Vertebrate Pest Predator Management Board—Three NWRC biologists attended the Second European Vertebrate Pest Management Conference in September in Braunschweig, Germany. More than 250 scientists from 25 different countries attended to discuss various aspects of vertebrate pest management. NWRC scientists organized and led symposia sessions on repellants as wildlife management tools and monitoring abundance of potential problem in wildlife species. The NWRC scientists made other presentations on nontarget impacts of strychnine baiting to reduce pocket gopher populations on forest lands in the United States, hormonal mechanisms of litter reduction under predator odor influence, black bear management to protect forest resources in Washington State, repellants as vertebrate pest management tools, a passive tracking index for monitoring wild canids and associated species, and integrated management tactics to assess risk and reduce damage to conifer reforestation by pocket gophers. Center posters addressed protecting lettuce from birds, reducing bird damage to aquaculture, and understanding the sensory biology of birds as related to chemical repellants.

University Seminars Presented on Indexing Animal Populations—An NWRC scientist has been developing methods to monitor population changes using passive track station surveys. He was invited to present seminars at two Colorado universities on this topic. In January, he gave presentations on this animal population at the University of Denver Health Sciences Center and at CSU. Resource managers need practical, efficient methods to accomplish the important task of monitoring pest populations before and after damage reduction activities. This passive tracking index may provide one such method.

Wildlife Society Conference—NWRC scientists and graduate students attended the Wildlife Society's 6th annual conference in Austin, TX, in September. The NWRC director and a research scientist made presentations in a symposium entitled "Improving Public Perception and Understanding of Wildlife Damage Management." Other NWRC scientists made six additional oral or poster presentations on research results relating to rodents, birds, and carnivores. The WS program also hosted a special symposium entitled "Bats and People: Conservation, Public Health, and Conflicts." All wildlife damage-management sessions were well attended. NWRC scientists also participated in the Wildlife Society's Wildlife Damage Management Working Group and a student mentoring session. About 1,400 people attended the conference.

11th Triennial International Biodeterioration and Biodegradation Symposium—The 11th International Biodeterioration and Biodegration Symposium was held in Arlington, VA, in August. Twenty different sessions on such topics as deterioration of wood construction materials, cultural property, consumer products, biomedical devices, and impacts of vertebrate pests attracted more than 300 participants. NWRC sponsored and cohosted with Bowling Green [OH] State University a special session on future technology for managing overabundant wildlife. Presentations focused on human–wildlife conflicts involving commensal and agricultural rodents and ungulates and on management techniques such as frightening devices, repellants, rodenticides, fumigants, fertility agents, and IPM approaches. Scientists from India and Pakistan also participated in this special session.

Wildlife Hazards Workshop—An NWRC scientist from the Sandusky field station presented an invited lecture on research findings on repellants, grass height management, and new technologies for reducing wildlife hazards to aviation at a Wildlife Hazards Workshop in August at Kansas City International Airport. About 100 airport operations personnel attended the workshop, which was sponsored by the American Association of Airport Executives. The presentation emphasized the complexity of wildlife management at airports and the necessity of planning and implementing professionally developed, science-based wildlife hazard management plans. The talk also emphasized needed research in the areas of vegetation management at airports to reduce bird activity. Presently there is much confusion over grass types and grass heights that are optimum to reduce overall bird activity for gulls, geese, and other species of concern at airports. The NWRC Ohio field station, under an interagency agreement with the FAA, is conducting multiyear vegetation studies in Ohio, New York, and Washington to better define vegetation management regimes that will minimize hazardous wildlife on airports. Wildlife strikes cost the civil aviation industry more than $300 million/year in the United States.

Kansas Blackbird Damage Management Seminar—A scientist from NWRC's Bismarck, ND, field station presented a seminar on blackbird damage management to the Kansas Farm Bureau in Manhattan, KS, in August. Attendees included feedlot operators, agricultural producers, and personnel from State and Federal agencies. Feedlot operators and agricultural producers incur extensive economic damage from 10 to 20 million blackbirds that roost in dense stands of cattail. Information was provided on potential methods of reducing blackbird damage, including the use of an aquatic herbicide to reduce roosting habitat. NWRC scientists plan to study the regional movements of this blackbird population in relation to sunflower and feedlot damage.

Tropical Fruit Damage by Birds—In south Florida, the tropical fruit industry is becoming increasingly important. Growers are annually harvesting more than 2.25 million pounds of litchis and longans, a related pulpy fruit, valued in excess of $4.5 million. Bird damage is becoming an important constraint to production for many tropical fruit growers. Common grackles appear to be the most serious pest species, but monk parakeets also cause significant damage, especially when they nest near an orchard. Biologists from NWRC's Gainesville field station conducted a preliminary trial to quantify the extent of bird damage to longans in three south Florida orchards. Estimates of fruit loss to birds in these three orchards ranged from 9 percent to 89 percent.

Also, an NWRC Gainesville field station biologist and University of Florida graduate student working with NWRC presented information regarding longan and litchi fruit damage by monk parakeets and grackles to a group of more than 100 tropical fruit farmers at a workshop on longan and litchi fruit production at the University of Florida's Tropical Research and Education Center in Homestead, FL, in August. The results from the preliminary damage assessment trial will be used to develop a cooperative program between the Center, NWRC, and Florida tropical fruit growers to formulate solutions to this bird damage problem.

United Nations Conference of the Directors General of Civil Aviation—A biologist at NWRC's Sandusky field station has written a technical paper for FAA entitled "Research and Management Programs To Reduce Wildlife Hazards at Civil Airports in the United States of America." This paper was presented by FAA officials at a United Nations conference of the directors general of civil aviation in Hanoi, Vietnam, in September 1999. The paper reviewed research and operational assistance that the WS program has provided to the FAA in reducing wildlife hazards to aviation. Since 1991, NWRC has also assisted the FAA with the development of a Wildlife Control Manual for Airport Operators, which was published in January 2000. These research activities support FAA policy regarding wildlife hazards and assist airports in complying with FAA regulations (14 CFR 139.337). In addition to the research activities, WS biologists, through a Memorandum of Understanding with the FAA, provided operational or technical assistance at 192 airports in 1998 to reduce wildlife hazards to aviation. The FAA–USDA partnership provides an outstanding model of cooperation and efficiency between Federal agencies to improve aviation safety.

USDA Under Secretary Dunn's Visit to Ohio—Michael V. Dunn, USDA's Under Secretary for Marketing and Regulatory Programs, visited the Sandusky field station on September 3, 1999. Dunn was provided an overview of research on wildlife–human conflicts being conducted by the NWRC Ohio field station. Most research at this station relates to developing technologies to reduce bird–aircraft collisions and blackbird damage to agriculture. Dunn was shown experiments involving lasers to disperse birds, vegetation management to discourage birds from landing on airfields and food waste composting to reduce gull populations at landfills. Station personnel also provided a demonstration of the National Wildlife Strike Database that NWRC manages for the FAA. Dunn also visited a local farm, where he observed an experimental use of helium filled balloon kites as part of an integrated management program to frighten redwinged blackbirds from sweet corn plantings. Blackbirds continue to have major impacts on corn in Ohio.

Colorado State University Career Fair—NWRC participated in the CSU Career Fair in September. A display highlighting research activities and brochures and pamphlets about WS and NWRC attracted many people and generated great interest in NWRC's research program. The purpose of the career fair was to provide an informal setting for students to learn more about career options and opportunities within State and Federal agencies and private industry.

Summer Winter Integrated Field Technologies (SWIFT) Conference—A biologist from NWRC's Sandusky field station presented an invited paper entitled "Does Tall Grass Reduce Bird Numbers on Airports?" at the SWIFT Conference held in September in Calgary, AB, Canada. The SWIFT conference is an annual gathering at which airport operators and maintenance personnel exchange technical information on the safe and efficient operation of airfields. The concern over bird numbers attracted by different grass heights relates to safe airport operations and the risk of bird–aircraft collisions (bird strikes). Under an interagency agreement with the FAA, NWRC is conducting multiyear vegetation studies in Ohio, New York, and Washington to better define vegetation management regimes that will reduce attraction of hazardous wildlife on airports. Bird strikes cost civil and military aviation $300 million annually in the United States and pose a safety hazard to flight crews and passengers. The conference was attended by more than 400 air travel industry professionals.

Avian Effects Assessment Workshop—Two NWRC scientists participated in an international workshop on avian effects assessment in September in Woudschoten, the Netherlands. The workshop was sponsored by the Society for Environmental Toxicology and Chemistry, the Organization for Economic Cooperation and Development, and the European Union. The 45 workshop participants reviewed a draft framework document for assessing the effects of pesticides on birds. In small working groups, participants applied the draft framework to specific case studies involving insecticidal seed treatments, fungicides, granular and foliar insecticides, rodenticides, and other types of chemicals. The resulting document will be the basis for a set of common testing standards to assess the effects of pesticidal chemicals on birds.

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[**Boldface type** indicates that an author is employed at NWRC.]

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